L 16289-65 ACCESSION NR: AP4044531

hydrogen atmosphere. The thermal emf instability of a thermocouple made of noble metals is caused mainly by contamination of one or both electrodes by impurities, especially iron, from ceramic protective sheaths. Pure dense Al203 is the best insulator for thermocouples of this group. Thermocouples made of W-Ir and Ir-Ir+60% Rh are good for measuring temperatures up to 2100C, but the high cost and scarcity of Ir restricts their use. Thermocouples made of W-Re alloys can be used to measure temperatures up to 2200C in vacuum, or in neutral or hydrogen medium. They are less susceptible to contamination by impurities than thermocouples of the platinum group. To obtain maximum stability the thermoelectrodes with a high Re content (W-Re--10/20 or W-Re--15/20) are required; this is especially important for use in a hydrogen atmosphere. Large-diameter electrodes should be used for operation in vacuum. The thermocouples can be used as standards at temperatures up to 1960C. Dense, pure Al203 insulation can be used for W-Re thermocouples for measuring temperatures up to 1950C. MgO insulation can be used up to 2200C. perature measurements in a carbon-containing atmosphere can be made

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L 16289-65 ACCESSION NR: AP4044531

using BeO sheaths. Boron nitride has good insulating properties and is a promising material for high-temperature protection of thermocouples. Orig. art. has: 4 figures and 5 tables.

ASSOCIATION: Konstruktorskoye byuro "Termopribor" (Design bureau "Termopribor"); Institut problem materialovedeniya AN UkrSSR (Institute of the Science of Materials AN UkrSSR)

SUBMITTED: 29Feb64

022 NO REF SOV: SUB CODE: TD, IE

035 OTHER:

ENCL:

00

Card 3/3

GLADYSHEVSKIY, Ye.I.; LAKH, V.I.; SKOLOZDRA, R.V.; STADNYK, B.I.

Investigating the mutual sclubility of group IV, V, and VI transition
metal sclibides. Porosh.met. 4 no.4:15-20 Jl-Ag 164.

(MIRA 18:8)

1. L'vovskiy gosudarstvennyy universitet imeni Franko.

Use of thermocouples in high-temperature measurements.
Teplofiz. vys. temp. 2 no.4:634-647 Jl-Ag '64.

(MIRA 17:9)

1. Konstruktsionnoye byuro "Termopribor" i Institut problem materialovedeniya AN SSSR.

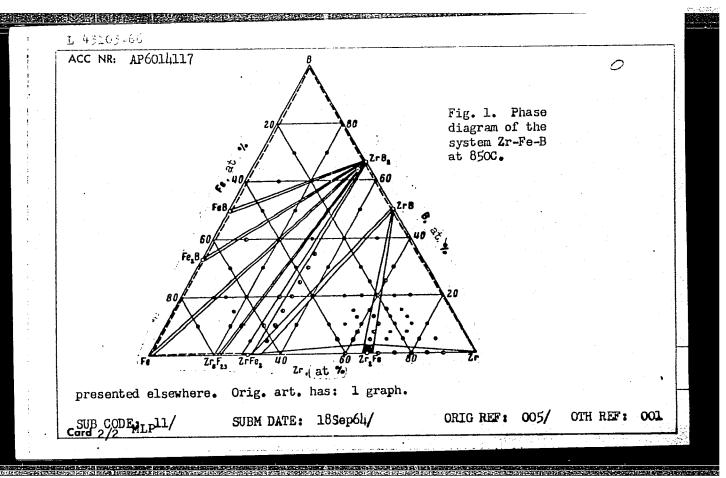
لتناجر بالأرد الأ SHE(=); SHE(m)/T/EHE(t); Sit idriti ਰੇਟਾ, ਜੋਜੈਨਰਚੇ ACC NR. AP6014117 SOURCE CODE: UR/0370/65/000/006/0127/0129 AUTHORS: Kuz'ma, Ye. B. (L'vov); Lakh, V. I. (L'vov); Voroshilov, Yu. V. (L'vov); Stadnyk, B. I. (L'vov); Markiv, V. Ya. (L'vov) ORG: none TIPLE: Phase diagram of the system Zr -- Fe-SOURCE: AN SSSR. Izvestiya. Metally, no. 6, 1965, 127-129 TOPIC TAGS: alloy phase diagram, zirconium containing alloy, iron containing alloy, boron containing alloy ABSTRACT: The phase diagram for the system Zr--Fe--B at 8500 was investigated by x-ray analysis. This investigation supplements the results of V. N. Svechnikov, V. M. Pan, and A. Ts. Spektor (Promezhutochnyye fazy v sisteme zhelezo-tsirkoniy. Zh. neorgan. khimii, 1963, 8, 2118). The specimens were prepared from Fe and ZrBr₂ at 16000. A total of 72 different specimens was studied, and the experimental results are presented graphically (see Fig. 1). In addition, the crystal structure of the compound Zr₂Fe was determined. It was found that the structure of Zr₂Fe is of the

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UDC: 669.017.13

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652810011-6"

Ti2Ni type with a = 12.14 A. A detailed description of the structure is to be



EWP(e)/EWT(m)/EWP(1)/EPF(n)-2/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c)IJP(c) JD/WW/HW/JG UR/0363/65/001/007/1112/1114 ACCESSION NR: AP5022261 546.831+546.73+546.27 AUTHOR: Kuz'ma, Yu. B.; Lakh, V. I.; Voroshilov, Yu. V.; Stadnyk, B. I. TITLE: The zirconium-cobalt-boron system SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 7, 1965, 1112-1114 TOPIC TAGS: zirconium alloy, cobalt alloy, boron alloy, zirconium compound, cobalt compound, boron compound, thermometry ABSTRACT: The object of the study was to establish the phase equilibria in the Zr-Co-B system and to determine whether alloys of this system can be used as new materials in thermometry. Samples of Zr-Co and Zr-Co-B were prepared by sintering powder mixtures. The phase compositions were determined by the x-ray powder technique. In the Zr-Co system, phase analysis showed the presence of the compounds Zr6Co23, ZrCo2, ZrCo, Zr2Co, and Zr4Co, the crystal structures of which were determined. An isothermal section at 800C was plotted for the Zr-Co-B system. Two ternary compounds exist in this system: a 7 phase Zr2Co21B6 with the face-centered cubic structure of $W_2Cr_{21}C_6$ (a =10.597 A), and a P phase of the

ACCESSION NR: AP5022261

approximate composition ZrCo3B. These ternary phases have much lower melting points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-melting eutectic (m. p. below 1200C) with the Co-base points than ZrB2, form a low-meltin

L h3773-66 ENT(1)/ENP(e)/ENT(m)/T/ENP(t)/NTI INF(c) JE/JI/INB
ACC NR: AP6020964 SOURCE CODE: UR/0226/66/000/006/0073/0076 63
AUTHOR: Kuz' ma, Yu. B.; Lakh, V. I.; Stadnyk, B. I.; Voroshilov, Yu. V.
ORG: L' vov "Order of Lenin" State University im. Iv. Franko, Design Bureau "Termopribor" (L' vovskiy ordena Lenina gosudarstvennyy universitet, KB "Termopribor")
TITLE: X-ray diffraction study of the system niobium-tungsten-boron
SOURCE: Poroshkovaya metallurgiya, no. 6, 1966, 73-76
TOPIC TAGS: niobium, tungsten, boron, x ray diffraction analysis, phase equilibrium, lattice constant, niobium containing system, tungaten containing
STRUCTURE
ABSTRACT: The paper deals with x-ray analyses of the system niobium-tungsten
boron. The phase equilibriums were established for the first time at 1500°C and
are shown in an isothermal cross-section view of the system in the original article.
Card 1/2

ACC NR: AP602096					D
has: 1 table and 3	2 and of Nob as a figures. [Based o	on authors' abs	tract]		[AM]
SUB CODE: 11/	SUBM DATE: 121	Mar66/ ORIG	REF: 001/	OTH REF:	007/
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L DO892-67 EMP(e)/EWT(m)/T/EWP(t)/ETI LJP(c) JD/WW/HW/JG

ACC NR: AP6021616

SOURCE CODE: UR/0021/66/000/006/0772/0774

AUTHOR: Kuz'ma, Yu, B.; Lakh, V. I.; Voroshylov, Yu. V. -- Voroshilov, Yu. V.; Stadnyk, B. I.

ORG: L'vov State University (L'vivs'kyy derzhavnyy universytet)

TITLE: Crystal structure of the compounds Zr2Ni21B6 and Zr2Co21B6

SOURCE: AN UkrRSR. Dopovidi, no. 6, 1966, 772-774

TOPIC TAGS: phase equilibrium, zirconium alloy, nickel alloy, cobalt alloy, boron alloy, x ray diffraction analysis, intermetallic compound; inoquine compatal

ABSTRACT: The authors study phase equilibrium in the Zr-Ni-B and Zr-Co-B systems. Fifteen alloys were studied in each of these systems with compositions of 5-20 at.% Zr, 80-55 at.% Ni(Co) and 15-25 at.% B. The alloys were prepared from powdered zirconium (99.5% Zr), nickel (99.9% Ni), cobalt (99.9% Co) and boron (99.5% B). These were thoroughly mixed and pressed into briquettes. The briquettes were then sintered in a vacuum furnace at 1200°C for two hours. After this, the specimens were melted in a vacuum arc furnace and subjected to homogenizing annealing in evacuated quartz ampules at 800°C for 120 hours. X-ray diffraction analysis based on Cr radiation was used throughout the study. The analysis shows the existence of the compounds $Zr_2Ni_{21}B_6$ and $Zr_2Co_{21}B_6$ (τ -phases). These compounds have cubic structures of the $W_2Co_{21}C_6$ type

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ACC NR: AP6021616

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(space group $Fm + 3m - 0_h^5$); for $Zr_2Ni_{21}B_6$ $a=10.628\pm0.005$ A, and for $Zr_2Co_{21}B_6$ $a=10.597\pm0.005$ A. The compound $Zr_2Ni_{21}B_6$ has a region of homogeneity located on the 20 at.% B isoconcentrate at a zirconium concentration of 5-15 at.%. Increasing the Zr concentration from 5 to 15 at.% and reducing the Ni concentration from 75 to 65 at.% increases the lattice constant of the τ -phase from 10.609 \pm 0.005 A to 10.702 \pm 0.005 A. The existence of a second ternary compound was discovered in the Zr-Co-B system with a composition similar to $ZrCo_3B$. This article was presented for publication by Academician V. M. Svyechnikov. Orig. art. has: 1 table.

SUB CODE: 20/1/ SUBM DATE: 30Nov64/ OTH REF: 001

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CIA-RDP86-00513R001652810011-6 "APPROVED FOR RELEASE: 08/25/2000

ACC NR: AP7007586

SCURCE CODE: UR/0432/66/000/CO2/0043/0045

AUTHOR: Stadnyk, B. I.; Gil', B. I.; Druk, R. V.

ORG: none

TITLE: High-temperature thermocouples for measuring the temperature of an oxidizing

medium

SOURCE: Mekhanizatsiya i avtomatizatsiya upravleniya, no. 2, 1966, 43-45

TOPIC TAGS: thermocouple, thermometer

. SUB CODE: 13

ABSTRACT: Thermocouples and resistance thermometers (contact measurement method) are used for achieving increased accuracy in measurements of high temperatures required in modern technological processes. The resistance thermometers presently manufactured may not be used for measuring temperatures above 650°C. The upper temperature limit for thermocouples lies considerably below the melting point of the thermal electrodes due to oxidation of the electrodes themselves, vaporization and diffusion of the metals in the hot junction, and chemical interaction between the material of the thermal electrodes, the ambient medium and the protective ceramic. The PR-13/1 thermocouple has a high rhodium content in the positive electrode and the thermoelectromotive force of the unit is more then

Card 1/3

ACC NR: AF7007586

10% higher than that of the PR-10/0. The PR-30/6 thermocouple is used for measuring temperatures up to 800°C. The positive thermal electrode in this unit is made from platinum plus 30% rhodium, while the negative electrode is made from platinum plus 6% rhodium. The PR-20/5, PR-30/6 and PR-40/10 thermocouples are used for brief temperature measurements up to 800°C, but are designed principally for replacing the PR-10/1 thermocouple in the 1500-1700°C range since they are more resistant to external effects and chemical contamination and show an error of less than ±4°C even after 5 hours of operation at 1600-1800°C. The PR-40/20 thermocouple shows the same error level in measuring temperatures up to 850° in an oxidizing atmosphere (air), but its sensitivity is only one half that of the PR-20/5, PR-30/6 and PR-40/10 units and, in addition, requires individual calibration. PR-10/0 thermocouples, which have been approved as standard instruments for the International Temperature Scale from 630 to 1063°C with an accuracy of $\pm 0.1^{\circ}$ C, are used for measuring temperatures up to 1200° C, and at a lower accuracy ($\pm 6^{\circ}$ C) — to a temperature of 1600° C. Thermocouples with thermoelectrodes made from iridium-rhodium alloys paired with iridium may be used for measuring the temperature of oxidizing media up to 2000°C. The most stable unit of this type is a thermocouple of iridium plus 60% rhodium paired with pure iridium (Ir+60% Rh/Ir). The thermoelectromotive force of the thermocouple is a linear function of temperature which facilitates calibration and interpolation. A thermoelectromotive force of about 11 mv is developed at a temperature of 2000°C, and measurements may be made at this temperature with satisfactory accuracy for 10-20 hours. Pencil Card 2/3

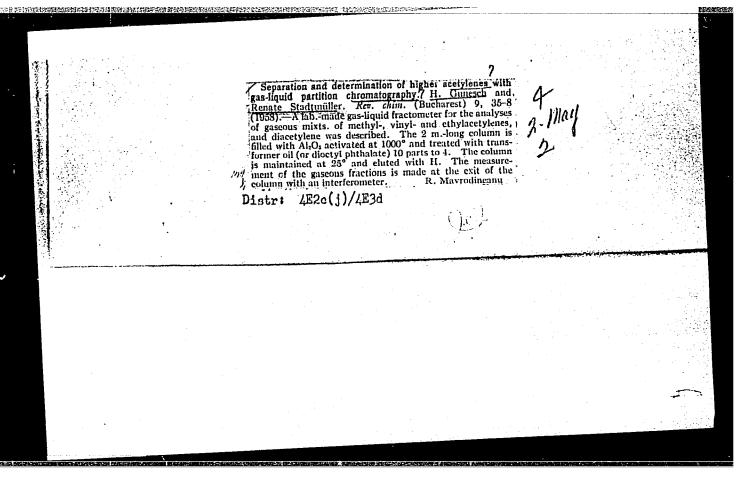
ACC NR: A17007586

type thermocouples with thermoelectrodes made from refractory compounds of the transition metals have been developed by the design bureau in cooperation with the Institute of Problems in the Science of Materials, Academy of Sciences Ukrainian SSR. A TMSV-340M molybdenum disilicide—tungsten disilicide thermocouple is used for measuring the temperature of oxidizing gases and liquids. The thermoelectromotive force in this instrument is a linear function of temperature and its sensitivity is 8-9 µv/deg. The change in thermoelectromotive force of this thermocouple is less than ±1.5% after 1000 hours of operation. The TMN-340M thermocouple is presently being successfully used for measuring temperatures in automating the commercial production of glass. The thermocouples described in this paper may be used in automating the metallurgical, chemical, petroleum and other branches of industry where high temperatures are encountered. Orig. art. has: 2 figures. [JPRS: 36,774]

Card 3/3

STADNYUK, Z.Ya. Use of polyester varnishes in the manufacture of furniture. Bum. i der. prom. no.3:3-6 J1-S 164.

(MIRA 17:11)



STADUKHIN, D.G., kand.ekonomicheskikh, nauk; SOLNTSEVA, Ye.M., kand. ekonomicheskikh nauk

Interindustrial potentialities as an economic category. Izv.vys. ucheb.zav.; gor.zhur. no.1:63-68 '60. (MIRA 13:6)

1. Sverdlovskiy gornyy institut imeni V.V. Vakhrusheva. Rekomendovana kafedroy politicheskoy ekonomii. (Mining engineering)

STADUKHIN, D.G., dotsent

Economic efficiency of basic capital assets of mining enterprises.

Izv.vys.ucheb.zav.; gor.zhur. no.3:65-72 *61. (MIRA 15:4)

1. Sverdlovskiy gornyy institut imeni V.V.Vakhrusheva; rekomendovana kafedroy politicheskoy ekonomii Sverdlovskogo gornogo instituta. (Sverdlovsk Province Mining industry and finance)

S/874/62/000/002/004/019 D218/D308

AUTHOR:

Stadukhin, V.D.

TITIE:

Determination of the magnetic susceptibility of natural rocks from the measured magnetic field-

strength at the center of a square frame

SOURCE:

Akademiya nauk SSSR. Ural'skiy filial. Institut geofiziki. Trudy. no. 2, 1962. Geofizicheskiy sbornik, no. 3, 79-84

The author describes a method for the determination of the susceptibility of rocks lying at a depth of 4-6 m below the surface. The method was developed in 1958-1959 at laboratoriya magnitopazvedki instituta geofiziki Ural'skogo filiala AN SSSR (Magnetic Prospecting Laboratory of the Institute of Geophysics of the Ural' Branch of AS USSR). Theory. The flux through a square frame which is parallel to the earth's surface consists of two components, namely, that due to the current flowing through the frame, and the flux due to the current flowing through the frame, and the flux due to the

Card 1/3

s/874/62/000/002/004/019 D218/D308

Determination of the magnetic ...

presence of rocks under the surface. The field due to the frame itself can be compensated in a preliminary experiment so that only the contribution due to the underlying rock remains. Formulas are derived giving the susceptibility in terms of the flux due to the rocks, the position of the frame, and its dimensions. It was found cal formulas have been checked with the aid of models. It was found that the minimum rocks. that the minimum volume of rock which will give the same vertical component as an infinite half-space (with the frame placed on its surface) is $4R \times 4R \times 2R$ where 2R is the length of one side of the square frame. The susceptibilities obtained by this method were found to be in good agreement with results obtained by other methods. The experimental values for the distance to the surface of the model were in agreement with the true value to within ± 5%. Irregularities on the surface of the model with an amplitude of 0.2R - 0.3R which are comparable in plan with the dimensions of the frame, or an inclination of the surface of the model to the plane of the frame by 10 -15%, give rise to errors in the distance of less than 10%. Field measurements have also been carried out using square frames of 10 x 10 and 20 \times 20 m². The frames were supplied by storage cells and the Card 2/3

S/874/62/000/002/004/019 D218/D308

Determination of the magnetic ...

increase in the vertical component at the center was measured with a Swedish ABEM magnetometer having a sensitivity of 9.7 7/division.

It was found that the susceptibility could be determined for rocks lying at a depth of 10-20 m below the surface. The position of the surface of the rocks could be determined provided the distance of the frame from the surface of the rocks was $\leq 1.2R - 1.3R$. The min-imum value of the susceptibility which could be reliably determined was 2 x 10⁻³ emu. There are 3 figures.

Card 3/3

STADUKHIN, V.D.

Determination of the magnetic susceptibility of rocks and ores by measuring the intensity of the magnetic field in holes with artificial magnetization in order to detect and evaluate iron ore deposits.

Izv. AN SSSR. Ser. geofiz. no.9:1381-1385 S '63. (MIRA 16:10)

1. Institut geofiziki Ural'skogo filiala AN SSSR.

IVANOV, N.A.: STADUKHTN, V.D.; ULITINA, G.G.

Charts for the approximate calculation of anomalous effect in the methods of magnetic profiling and sounding. Trudy Inst.geofiz.UFAN SSSR no.3:65-71 '65. (MIRA 18:8)

CIA-RDP86-00513R001652810011-6 "APPROVED FOR RELEASE: 08/25/2000

STADUKHIN, V.D.; ULITINA, G.G. Magnetic profiling with square and retangular frames in the Techenskoye iron ore deposit. Trudy Inst.geofiz.UFAN SSSR (No.3:73-77 165. (MIRA 18:8)

CIA-RDP86-00513R001652810011-6" APPROVED FOR RELEASE: 08/25/2000

CIA-RDP86-00513R001652810011-6 "APPROVED FOR RELEASE: 08/25/2000

ALEXNIKOV, A.L.; STADUKHIN, V.D.; ULITINA, G.G. Interpretation of magnetic and gravity measurements using data of artificial magnetic biasing. Trudy Inst.geofiz.UFAN SSSR no.3:97(MIRA 18:8)

102 165.

CIA-RDP86-00513R001652810011-6" APPROVED FOR RELEASE: 08/25/2000

STAER, Jan, mgr inz.

An example of correction of the power coefficient in the plant and resulting advantages. Energetyka przem 10 no.12:427-429 D '62.

1. PR-2 Elektromontaz, Katowice.

B/005/63/000/001/001/001 D274/D308

Yordanov, D., Engineer, Stafanova, N., Kulchitski, V. and Iliev, Lozan

TITLE:

Introduction of gas cyanization of structural steel

in the State Machine building Plant at Kolarovgrad

PERIODICAL:

Mashinostroene, no. 1, 1963, 12-18

TEXT: The experiments were carried out with round specimens made of medium-carbon alloy steel 40X (40Kh), in U-105 (Ts-105) furnaces at a temperature of 790-840°C. During the gas cyanization, petrol and liquid ammonia entering the furnace from different points were used as the active gas. The petrol was fed in by a dropper, while the consumption of ammonia was read on a rheometer charged with toluene. Best results with respect to the diffusion of carbon and nitrogen in the surface layer of the specimens were obtained by using an optimum quantity of 250-300 drops/min of petrol and 14 liters/min of ammonia. Under these conditions the layer attains its highest durability and stability, and a higher strength

Card 1/2

Introduction of gas ...

B/005/63/000/001/001/001 D274/D308

of wear than when a liquid cyanization is applied. The duration of the process of saturation must not exceed 100-110 minutes, when the required layer of 0.25 mm thickness is obtained. This process cuts the time of liquid cyanization by 15-20%. During the optimum conditions of the process an &-phase in the structure of the diffusion layer does not exist i.e. the strength of the specimens is higher, and the transition to the core is smoother. The fatigue limit of the specimens was 57.1 kg/mm². The effect of gas cyanization on the deformation of different machine parts was within the admissible limits. There are 12 figures and 6 tables.

Card 2/2

J. 14 12 1 19 4 4 4

"Malionia in lathargic hypothermia. p. 213, (314), Vol. 6, No. 210, 1953, Leogral, Yugoslavia)

SO: Bonthly List of East Auropean Accessions, (AZAL), LO, Vol. 4, Bo. 4, Apr 1950, Uncl.

RAMAN, M. [Ramans, M.]; STAFETSKIY, L. [Stafeckis, L.]

Results of testing the air conditioning system for passenger cars. Izv. AN Latv. SSR no.5:53-60 '62. (MIRA 16:7)

1. Institut energetiki AN Latviyskoy SSR.
(Railroads—Cars—Air conditioning)

ACC NR: AP7005267

formation than ever a rest of the section of the se

SOURCE CODE: UR/0371/66/000/006/0084/0090

AUTHOR: Nayer, V. A.—Naers, V.; Raman, M. L.—Ramans, M.; Simanovskaya, A. Ye.—Simanovska, A.; Stafetskiy, L. P.—Stafeckis, L.; Shalenyy, E. G.—Salonijs, E.

ORG: Institute of Physics and Power Engineering of the Academy of Sciences, Latvien SSR (Fiziko-energeticheskiy institut AN Lat).

TITLE: Investigation of semiconductor thermopiles for cooling and heating of air

SOURCE: AN LatSSR. Izvestiya. Seriya fizicheskikh i tekhnicheskikh nauk, no. 6, 1966, 84-90

TOPIC TAGS: semiconductor device, refrigeration equipment, thermoelectric cooling, thermoelectric equipment, AIR CONDITION INS EQUIPMENT, AIR HEATER

ABSTRACT:

The design and development of a semiconductor thermopile which is the basis of a prospective all-year-round air conditioner for passenger railroad cars is described. The thermopile is made from materials whose z is in the range of (2-2.2)·10⁻³ 1/K. The basic materials for its positive side are Sb₂Te₃ and Bi₂Te₃; for the negative side they are Bi₂Te₃ and Bi₂Se₃. It is made from 96 thermocouple elements (20 x 20 x 3.8 mm each) connected in a series circuit with copper commutational plates which are finned on the cold and hot sides. The fins are 40 and 60 mm high on the cold and hot sides, respectively, and their thickness and the spacing between them are 0.5 mm

ACC NR: AP7005267

and 1 mm. The hot junction is cooled by forced air circulation. The thermopile was bench-tested under simulated environmental conditions to determine its cooling and heating capacities. The maximum obtained cooling capacity was 425 w at a cooling factor of 0.57 for an airflow rate of 150 kg/hr. The heating capacity ranged from 170 to 600 w at a heating factor from 3.2 to 1.5 for an airflow rate of 222 kg/hr and an operating current range from 50 to 150 amps. A disadvantage of the thermopile is its low cooling factor in comparison to that of compression-type coolers. The thermopile heater is more efficient than electrical heaters, however. Since air conditioners on railroad cars operate as heaters for prolonged periods of time, it is economically advantageous to use semiconductor heat sources rather than conventional electric heaters. Orig. art. has: 4 figures and 19 formulas.

SUB CODE: 09, 13/ SUBM DATE: 14May65/ SOV REF: 003/ ATD PRESS: 5115

Card 2/2

ROTACH, V.Yn., kand. tekha. rank, dotront; STAFFYCHUE, B.G., Inzh.

Effect of the parameters of drift of an object on the stability and quality of transient processes in cystems with a Smith-type linear advance unit. Izv.vys.ucheb.zav.; energ. 8 no.9:119-123 S 165. (MIRA 18:10)

1. Moskovskiy ordena Lenina energeticheskiy institut. Predstavlena kafedroy teplovogo kontrolya i avtomatiki.

ACC NR: AP6021537 SOURCE CODE: UR/0143/66/000/006/0121/0124 Docent AUTHOR: Rotach, V. Ya. (Candidate of technical sciences); Stefeychuk, B. G. (Engineer) ORG: Lenin Power Institute, Moscow (Moskovskiy ordens Lenins Benergeticheskiy institut) TITLE: Pulse regulation of objects with lag SOURCE: IVUZ. Energetika, no. 6, 1966, 121-124 TOPIC TAGS: automatic regulation, pulse modulation Servemoloc ABSTRACT: The article gives the results of an analysis of a pulse system of automatic regulation, the object of which can be approximated by a transmission function of the form: $W_{oo}(s) = \frac{k_{oot}}{T_{obs}+1} e^{-t_{oot}}.$ (i) and in which the regulator consists of a pulse modulator with amplitude modulation of the pulses and an integrating serve motor. Results of calculations on the above besis show that pulse regulation cannot be considered as a means of improving the dynamics of a control system with UDC: 65.011.56	L 46166-66 EWT(1)			
AUTHOR: Rotach, V. Ya. (Candidate of technical sciencea); Stafeychuk, B. G. (Engineer) ORG: Lenin Power Institute, Moscow (Moskovskiy ordena Lenina energeticheskiy institut) TITLE: Pulse regulation of objects with lag SOURCE: IVUZ. Energetika, no. 6, 1966, 121-124 TOPIC TAGS: automatic regulation , pulse modulation servements. ABSTRACT: The article gives the results of an analysis of a pulse system of automatic regulation, the object of which can be approximated by a transmission function of the form: $W_{os}(s) = \frac{k_{os}}{T_{os}+1} e^{-t_{os}^2}.$ (i) and in which the regulator consists of a pulse modulator with amplitude modulation of the pulses and an integrating serve motor. Results of modulations on the above basis show that pulse regulation cannot be considered as a means of improving the dynamics of a control system with UDC: 65.011.56	ACC NE ARCOST COT	SOURCE CODE:	UR/0143/66/000/00	06/0121/0124
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ORG: Lenin Power Institute, Moscow (Moskovskiy ordens Lenins energeticheskiy institut) TITLE: Pulse regulation of objects with lag SOURCE: IVUZ. Energetika, no. 6, 1966, 121-124 TOPIC TAGS: automatic regulation , pulse modulation servander ABSTRACT: The article gives the results of an analysis of a pulse system of automatic regulation, the object of which can be approximated by a transmission function of the form: $W_{oo}(s) = \frac{k_{oo}}{T_{obs}^2 + 1} e^{-t_{oo}t}. \tag{1}$ and in which the regulator consists of a pulse modulator with amplitude modulation of the pulses and an integrating servo motor. Results of calculations on the above basis show that pulse regulation cannot be considered as a means of improving the dynamics of a control system with UDC: 65.011.56	B. G. (Engineer)		·	75
SOURCE: IVUZ. Energetika, no. 6, 1966, 121-124 TOPIC TAGS: automatic regulation , pulse modulation servernotes ABSTRACT: The article gives the results of an analysis of a pulse system of automatic regulation, the object of which can be approximated by a transmission function of the form: $W_{os}(s) = \frac{k_{os}}{T_{os}+1} e^{-i_{os}s}, \qquad (i)$ and in which the regulator consists of a pulse modulator with amplitude modulation of the pulses and an integrating serve meter. Results of calculations on the above basis show that pulse regulation cannot be considered as a means of improving the dynamics of a control system with UDC: 65.011.56	ORG: Lenin Power Institute	e, Moscow (Moskovs	skiy ordena Lenind	B
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TOPIC TAGS: automatic regulation , pulse modulation Servomoloc ABSTRACT: The article gives the results of an analysis of a pulse system of automatic regulation, the object of which can be approximated; by a transmission function of the form: $W_{oo}(s) = \frac{k_{oo}}{T_{oo}^{-1} + 1} e^{-t_{oo}^{-1}}. \tag{i)}$ and in which the regulator consists of a pulse modulator with amplitude modulation of the pulses and an integrating servo motor. Results of calculations on the above basis show that pulse regulation cannot be considered as a means of improving the dynamics of a control system with UDC: 65.011.56	SOURCE: IVUZ. Energetika	, no. 6, 1966, 12:	1-124	
ABSTRACT: The article gives the results of an analysis of a pulse system of automatic regulation, the object of which can be approximated by a transmission function of the form: $W_{ob}(s) = \frac{k_{ob}}{T_{ob} + 1} e^{-t_{ob} s}, \qquad (i)$ and in which the regulator consists of a pulse modulator with amplitude modulation of the pulses and an integrating servo motor. Results of calculations on the above basis show that pulse regulation cannot be calculations on the above basis show that pulse regulation cannot be considered as a means of improving the dynamics of a control system with considered as a means of improving the dynamics of a control system with	TOPIC TAGS: automatic req	ulation , puls	e modulation, ser	vanoter
$W_{o5}(s) = \frac{k_{o5}}{T_{o5}+1}e^{-i_{o5}s}$, (1) and in which the regulator consists of a pulse modulator with amplitude modulation of the pulses and an integrating servo motor. Results of modulations on the above basis show that pulse regulation cannot be calculations on the above basis show that pulse regulation cannot be considered as a means of improving the dynamics of a control system with considered as a means of improving the dynamics of a control system with	ABSTRACT: The article giv	es the results of tion, the object	an enelysis Of &	DOTZO
and in which the regulator consists of a pulse modulator with amplitude modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation of the pulses and an integrating servo motor. Results of modulation cannot be calculations on the above basis show that pulse regulation cannot be considered as a means of improving the dynamics of a control system with considered as a means of improving the dynamics of a control system.	$W_{ob}(s) = -\frac{1}{3}$	$\frac{k_{06}}{k_{06}+1}e^{-t_{06}s}$,	,	
UDC: 65.011.56	and in which the regulator modulation of the pulses a	consists of a pu	vies regulation C	annot be
Cord 1/2	Card 1/2			3

lag. Orig. art. has: 13 formulas and 3 figures.									
SUB CC	DE: 09,13/	SUBM DATE:	05May65/	ORIG R	sf: 00ц/	ОТН	REF:	002	, H
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l. Nachal'nik OOT Gornogo upravleniya Kuznetskogo metallurgicheskogo kombinata. (Iron mines and mining) (Weekly rest-day)	######################################	95 N 56.	broken work week (Sunday off		
		1. Nachal'nik	T Gornogo upravleniya Kuznetskogo metallurgicheskogo		
		kombinata.			
					. (. (.)

The broken work wee (Sunday off) at mines has justified itself.

(KIRA 10:9)

Sots.trud no.9:106-108 S '57.

1. Nachal'nik otdela organizatsii truda Gornogo upravleniya Kunnetskogo metallurgicheskogo kombinata. (Kuznetsh Basin--Iron mines and mining)

CIA-RDP86-00513R001652810011-6

SOSUL'NIKOV, A.; STATEYEV, A.; ALEKSANDROV, N.; SITNIKOV, V.; LEVIN, A.; KHOKHLUSHIN, V.; KARSHENBAUM, S.

Take into consideration experience in changing over to the sevenhour and six-hour day. Sots. trud. no.6:99-117 Je '58.

1.Zamestitel' nachal'nika otdela organizatsii truda Kuznetskogo metallurgicheskogo kombinata (for Sosul'nikov). 2. Nachal'nik otdela organizatsii truda gornogo upravleniya Kuznetskogo metallurgicheskogo Kombinata (for Stafeyev). 3. Nachal'nik otdela truda i zarabotnoy platy Upravleniya khimicheskoy promyshlennosti Moskovskogo oblastnogo sovnarkhoza (for Sitnikov). 4. Starshiy inzhener otdela truda i zarabotnow platy Upravleniya khimicheskow promyshlennosti Moskovskogo oblastnogo sovnarkhoza (for Levin). 5. Direktor Moskovskogo instrumental'nogo zavoda "Kalibr" (for Khokhlushin). 6. Nachal'nik otdela truda i zarabotnow platy Moskovskogo instrumental*nogo savoda "Kalibr" (for Karshenbaum). (Hours of labor) (Industrial management)

CIA-RDP86-00513R001652810011-6"

APPROVED FOR RELEASE: 08/25/2000

SHLIONSKIY, N.; STAFETEV, A.

Bonus system at ore-dressing and sintering plants.
Sots.trud 5 no.1:128-130 Ja '60. (MRA 13:6)

1. Gornoye upravleniye Kuznetskogo metallurgicheskogo kombinata,
g. Stalinsk.

(Ore dressing) (Bonus system)

STAFEYEV, A.

Comprehensive organization of work in the mines of the Kuznetsk Metallurgical Combine. Sots. trud 6 no.6:121-123 (MIRA 16:8)

l. Nachal'nik otdela ekonomicheskikh issledovaniy Vostochnogo nauchno-issledovatel'skogo gornorudnogo instituta, Stalinsk.

CIA-RDP86-00513R001652810011-6 "APPROVED FOR RELEASE: 08/25/2000

BOGOMOLOV, M.; STAFEYEV, A. Determining the number of repair-shop workers in shifting to a centralized repair system in an ore dressing and sintering plant. Biul.nauch. inform.: trud i zar. plata 5 no.3:41-44

162.

(Abagur-Ore dressing) (Abagur-Sintering)

(MIRA 15:3)

STAFEYEV, A. A.

Electric lines -- Overhead.

Instrument for measuring the height of overhead electric transmission lines. Rab. energ., 1, No. 1, 1952.

Monthly List of Russian Accessions, Library of Congress, October 1952. unclassified.

STAFEYEV, A. I.

Lumber - Standards

Loading is not to be separated from the whole of lumbering operations. Les. prom. 12 no. 9, 1952.

1952

9. Monthly List of Russian Accessions, Library of Congress, December 1968, Uncl.

VOTINOV, M.P.; LAPINSKAYA, Ye.M.; KHENOKH, M.A.; YEVDOKIMOV, V.F.; ANTUF'YEV, V.V.; STAFEYEV, A.V.

Electron paramagnetic resonance spectra of hippuric acid irradiated by gamma rays of Co⁶⁰. Radiobiologiia 1 no.1:149-150 '61. (MIRA 14:7)

1. Politekhnicheskiy institut im. M.I.Kalinina i Institut tsitologii AN SSSR, Leningrad. (PARAMAGNETIC RESONANCE AND RELAXATION)

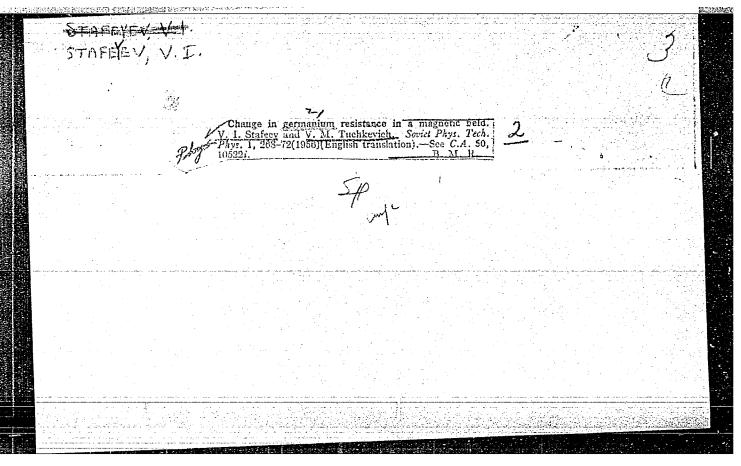
(HIPPURIC ACID)
(GAM-A RAYS_PHYSIOLOGICAL EFFECT)

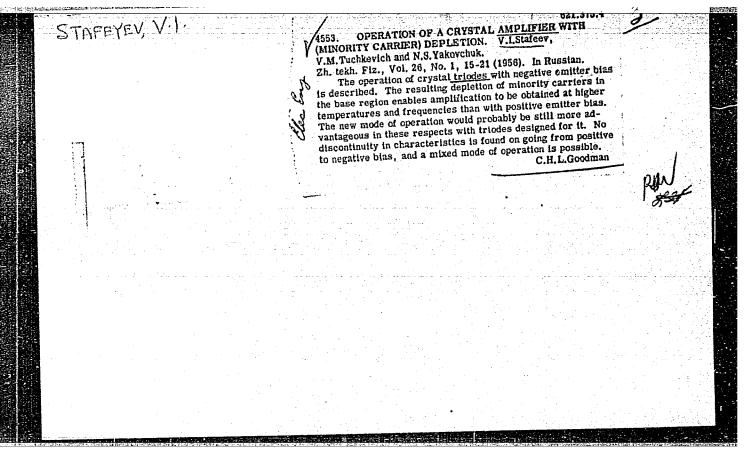
STAFEYEV, K.G.

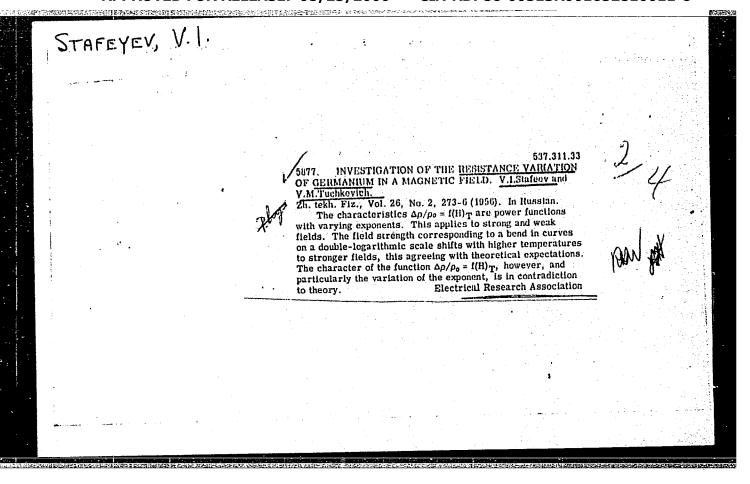
Thrust in the Tungir trough (northeastern Transbaikalia). Geotektonika (MIRA 18:8) no.4:108-109 Jl-Ag 165.

1. Vsesoyuznyy mauchno-issledovatel'skiy institut mineral'nogo syr'ya, Moskva.

	STAFEYEV, \		ું ું
	, , , , , , , , , , , , , , , , , , , ,	Operation of a Transistor Amatifier in Mode. V. I. Staticey, the Egression Mode. V. I. Staticey, V. M. Tuchkevich, and N. S. Iakovchuk. No. I. Soviet Physics—Tech. Paysies, No. I. M. Static Moderate in ustante manner at stone mode operate in a stante manner at slou manner at slou mode operate in a slou mode operate in a slou mode	
	y Di	sion mode operate in a status manufactures, and that the power higher temperatures, and that the power amplification is higher than for the injection mode. A combination of egression and injection modes permits the power output to be held approximately constant at a specified oscillatory power for considerable variation in temperature.	
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STAFEYEY VI.

SUBJECT USSR / PHYSICS

CARD 1 / 2

PA - 1552

AUTHOR

LEBEDEV, A.A., STAFEEV, V.I., TUCKEVIC, V.M.

TITLE

Some Properties of the Diodes consisting of Germanium with a

Gold Admixture.

PERIODICAL

Zurn.techn.fis, 26, fasc.10, 2131-2141 (1956)

Issued: 11 / 1956

As gold atoms form two acceptor levels which are deep in the forbidden zone, the properties of germanium may depend in a high degree on the ratio of the concentrations of the gold atoms and any donor admixture in the germanium. Let it be assumed that N_{Au} and N_{D} denote the concentration of the gold atoms and donor atoms respectively.

At $N_{Au} > N_D$ the germanium has hole-conductivity (here called germanium of the I.type), but at 2 $N_{Au} > N_D > N_{Au}$ it is electronic and the temperature dependence of the conductivity depends on the distance of the upper acceptor level of the gold from the bottom of the conductivity zone (Δ E = 0,2 eV). (Here called germanium of the II. type). However, in the case of $N_D > 2N_{Au}$ all gold levels are stopped up at all temperatures, and the germanium then has electronic conductivity. (Here called germanium of the III. type). The admixture of gold exercises hardly any influence at all on the temperature dependence of conductivity. The diodes produced from germanium of the I. II. and III. types are here described as diodes of the I.II. and III. groups. The properties of Ge III are not deter-

STAfeyer, V.I.

AUTHOR:

Stafeyev, V. I.

57-10-2/33

TITLE:

Note on Current Multiplication of Minority Carriers in the Non-Ideal p-n Junction (Umnozheniye toka neosnovnykh nositeley v

neideal nom p-n-perekhode).

PERIODICAL: Zhurnali Tekhn. Fiz., 1957, Vol. 27, Nr lo, pp. 2195-2211 (USSR).

ABSTRACT:

The purpose of the present investigation was to create an entirely new semiconductor apparatus of a thyratron type. Its mode of operation should not be connected with the effects caused by the strong electrical field and it should operate at high frequencies. The solution of this problem was possible only after careful analysis of a non-ideal p-n junction, which is detailed here. The analysis shows, that an additional electric field occurs in the diffusion range of such a zone. In such p-n transition the not real carriers do not move only under the influence of the gradient of concentration, but also under the influence of the electric field, which grows in magnitude with increasing current deduction. This is most pronounced in the case of p-i junctions. Here the hole current is connected with the deduction current. The existence of this relation between the hole current and the deduction current leads to the possibility of amplifying a current

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Note on Current Multiplication of Minority Carriers in the 57-lo-2/33 Non-Ideal p-n Junction.

of non-equilibrium minority carriers by a non-ideal p-n transition. The utilization of a non-ideal p-n transition as a triode-collector makes it possible to obtain triodes, namely drift-triodes, where the injected carriers are transmitted from the emitter to the collector essentially not by diffusion, but by the electric field. This enhanced their frequency properties. Such triodes with a non-ideal collector possess a current amplification coefficienta, in a scheme with a common basis, which is larger than one. The alloyed triode with o > represents a new apparatus of a thyratron type in a qualitative respect. A triode of such a type has a range of negative resi stance in the collector circuit. The breaking voltage can be regulated in a range from a few volts to 150 - 200 volts. After the breaking the current can reach 150 - 300 mA. The transition time from one state to the other is of the order of magnitude of 0,1 to 0,2 Msec. (from the closed to the open state). There are 3 tables, lh figures and 2 Slavic references.

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Note on Current Multiplication of Minority Carriers in the 57-lo-2/33 Non-Ideal p-n Junction.

ASSOCIATION. Leningrad Physical Technical Institute AN USSR (Leningradskiy fiziko-tekhnicheskiy institut AN SSSR).

SUBMITTED. April 20, 1957.

AVAILABLE. Library of Congress.

Card 3/3

STARMENT, V.I., Cand Phys-Meth Sci — (disc) "New principles of Action Application of scale conductor application." Len, 1952. 10 pp (Mend Sci USSZ. Physical Inct), 150 copies (ML,44-52,119)

AUTHOR:

Stafeyev, V. I.

SOV/57-58-8-2/37

TITLE:

Influence of Resistance of the Semiconductor: Body Upon the Shape of the Diode Voltage Versus Current Curves (Vliyaniye

soprotivleniya tolshchi poluprovodnika na vid vol'tampernoy

kharakteristiki dioda)

PERIODICAL:

Zhurnal tekhnicheskoy fiziki, 1958, Nr 8,

pp. 1631 - 1641 (USSR)

ABSTRACT:

A formula (20) is deduced for the voltage versus current function of the diode taking into consideration the voltage drop in the semiconductor. The condition p = p at the second contact was required to be satisfied by the solution. The formula in this general form does not incorporate the dependence of the diode current upon the voltage applied to the diode. Hence two opposite limit cases are investigated:

1) The voltage versus current characteristic in the backward direction and in the forward direction with low levels of injection. 2) The voltage versus current characteristic of the high levels of injection. If the injection levels are low,

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the formula, as usual, reads as follows:

Influence of Resistance of the Semiconductor Body SOV/57-58-8-2/37. Upon the Shape of the Diode Voltage Versus Current Curves

 $I = I_s \begin{pmatrix} q(V-IR_T) \\ \hline kT \end{pmatrix}, \text{ where I denotes the total}$ current, I the saturation current, V the total voltage drop at the diode, p the concentration of the holes in the n-domain, p the equilibrium concentration of the holes in the n-domain, and q the electron charge. R_T , however is greater than the ohmic resistance of the body. The greater the ratio of the mobilities, the greater R_T will be. In diodes from a p-material R_T is smaller than the ohmic resistance of the body. If the levels of injection are high, the voltage versus current characteristic reads as follows:

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Influence of Resistance of the Semiconductor Body SOV/57-58-8-2/37. Upon the Shape of the Diode Voltage Versus Current Curves

$$c=2\frac{d}{b+1} \ , \ \text{As c is a function of} \ \frac{d}{L} \ \text{ alone a}$$
 study of the voltage versus current characteristic permits to determine the magnitude of d/L at high amperages. Hence the effective length of the diffusion displacement in the diode body

$$L = \frac{d}{\text{arc ch } \frac{(b+1)c-2b}{2}}$$

can be determined. The correctness of the theory developed is substantiated by these experimental studies. The computed and the measured values of I and of L well agree with each other. In diodes with an impurity conductivity the current decreases at voltages "> V with a temperature rise. V is of the order of the width of the forbidden zone. V.M.Tuchkevich was interested in this work. There are 2 figures, 1 table,

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CIA-RDP86-00513R001652810011-6 "APPROVED FOR RELEASE: 08/25/2000

SOY/57-58-8-2/37 Influence of Resistance of the Semiconductor Body Upon the Shape of the Diode Voltage Versus Current Curves

and 9 references, 4 of which are Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut, AN SSSR (Leningrad Physical and Technical Institute, AS USSR)

April 10, 1958 SUBMITTED:

Card 4/4

AUTHORS:

Stafeyev, V. I., Tuchkevich, V. M.

sov/57-58-8-3/37

TITLE:

Dependence of the Hall Constant Upon Temperature and Magnetic Field Strength in p-Type Germanium (Zavisimost:

postoyannoy Kholla ot temperatury i napryazhennosti

magnitnogo polya v germanii p-tipa)

PERIODICAL:

Zhurnal tekhnicheskoy fiziki, 1958, Nr 8, pp 1642-1645 (USSR)

ABSTRACT:

This is an investigation of the function of the Hall-(Kholl) constant versus H and T. The same samples of hole-conducting germanium were used as in reference 4. Data concerning these samples are therefore omitted. R was measured in a usual d. c. circuit and with a constant magnetic field. Hole-conducting semiconductors exhibit a pronounced dependence of R upon H in weak fields. At H > 4000 Oe and $-145^{\circ}C$ and at H > 8000 Ce and at room temperature a complete saturation is attained. The saturation resistance is smaller by a factor of 1,5 than that in weak fields. The sample in question exhibited a mixed conductivity of 53 Ohm . cm. Another sample with 1,47 Ohm displayed curves which above + 50°C are practically parallel. The dependence of the temperature at which the Hall constant tends towards zero upon the magnetic field strength is

Card 1/3

Dependence of the Hall Constant Upon Temperature and Magnetic Field Strength in p-Type Germanium

SOV/57-58-8-3/37

described. It is contrary to that expected from theoretical considerations. $T_{R=0}$ varies by $7^{\circ}C$ at a field strength variation reaching almost 20 500 Oe. A similar dependence of $T_{R=0}$ upon H was found in all hole-conducting germanium samples. The function of R versus T is given for a few values of the magnetic field strength. The weaker the field, the more rapidly the Hall-constant will increase at a temperature rise. At H = 2200 Oe this gradient reaches 30% of that at lower temperatures. In strong fields R is almost independent of temperature in the whole range of impurity conduction. Previous to the decrease of R, however, a small increase of R is observed when the state of mixed conduction is approached in fields not exceeding 19 300 Oe. It is absolutely impossible to ascribe the increase of the Hall-constant at a temperature rise to a real reduction of the number of current carriers. As an explanation of the anomalous behaviour of p-germanium a model with three types of carriers was advocated in reference 9: electrons, "ordinary" holes and "fast" holes. The results obtained in this investigation can all be explained with the

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Dependence of the Hall Constant Upon Temperature and Magnetic Field Strength in p-Type Germanium

SOV/57-58-8-3/37

help of this model. The conception of "fast" holes is at present a mere hypothesis. Ye. Solov'yev assisted in a few of the measurements. There are 5 figures and 17 references,

3 of which are Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut AN SSSR

(Leningrad Physical and Technical Institute AS USSR)

SUBMITTED:

April 10, 1958

Card 3/3

CIA-RDP86-00513R001652810011-6" APPROVED FOR RELEASE: 08/25/2000

LOKTIONOV, A.A.; STAFEYEV, V.I.; TAKIBAYNV, Zh.S.

Studying the spatial distribution of nuclear disintegrations with thick nuclear emulsions. Vest.AN Kazakh.SSR 14 no.10:49-59 0 58.

(Cosmic rays) (Photography, Particle track)

STAFEYEV, V.I.

Modulation of the diffusion displacement length as a new principle in the operation of semiconducting devices. Fiz. tver. tela 1 no.6: (MIRA 12:10)

1. Leningradskiy fiziko-tekhnicheskiy institut AN SSSR. (Germanium diodes)

STAFEYEV Y. I

Current - voltage characteristics of a diode during superhigh levels of injection. Fiz. tver. tela 1 no.6:848-850 Je '59. (MIRA 12:10)

1.Leningradskiy fiziko-tekhnicheskiy institut AN SSSR. (Diodes)

24,2600 24.7700 s/181/60/002/02/32/033 B006/B067

AUTHORS:

Kramareva, S. A., Stafeyev, V. I.

TITLE:

Investigation of Some Properties of "Long" Diodes

Fizika tverdogo tela, 1960, Vol. 2, No. 2, pp. 377-379 PERIODICAL:

TEXT: The forward current of "long" diodes largely depends on the diffusion length; in a previous paper (Ref. 1) Stafeyev has demonstrated that when the diffusion length increases with the injection level a negative resistance can be observed in the straight branch of the currentvoltage characteristic of such a diode. In the present paper, the authors report on investigations of the temperature dependence of this branch, and give some new results on the photosensitivity of "long" diodes. The geometry of these diodes is described in Ref. 1. For improving the heat of emission the samples were examined in a liquid medium (in kerosene at moderately low temperatures, in liquid nitrogen at liquid nitrogen temperatures). Fig. 1 shows the direct branches of the current-voltage characteristic of a typical "long" diode recorded at different temperatures. In this diode, the negative resistance disappeared at +30°C. As may be ١X

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Investigation of Some Properties of "Long"

seen from Fig. 1 the "stripping voltage" largely increases with decreasing temperature, whereas the "stripping current" remains practically constant. This is explained by a reduction of the diffusion length. Some of the samples showed no negative resistance even at liquid nitrogen temperatures. The carrier lifetime was either independent of the injection level, or it decreased with increasing current. The latter case was observed in a diode whose direct branch is shown in Fig. 2 (Io-curve). Such a diode may have a negative photoeffect, i.e., the current may become lower than the dark current if a so-called "secondary" mechanism of photosensitivity occurs (i.e., when the lifetime changes due to irradiation). This was observed in one of the diodes investigated; Fig. 2 shows the direct branches of the current-voltage characteristic of this diode recorded at two different irradiation intensities. At low direct voltages (below the injection level), the concentration of the minority carriers injected from the p-n junction is low, and the lifetime changes hardly influence the current (monotonic rise of the photocurrent with increasing radiation intensity). If the direct current increases, also the concentration of the injected carriers increases (due to the so-called primary mechanism); however, it is reduced as a consequence of the

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S/181/60/002/03/11/028 B006/B017

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Stafeyev, V. I.

AUTHOR: TITLE:

Injection Heat Transfer

PERIODICAL:

Fizika tverdogo tela, 1960, Vol. 2, No. 3, pp. 438-444

TEXT: The present paper describes a theoretical investigation of the mechanism of the occurrence of the Peltier effect in a semiconductor diode with p-n junction under varying recombination conditions. The first thermoelectric investigations of semiconductors were made by the Czech physicists Tauc and Trousil (Refs. 3 and 4) who calculated the thermo-emf occurring in currentless p-n junctions, and who published the first experimental results. In the present paper, the author tries to investigate the fundamental thermal processes developing in a diode with p-n gate the fundamental thermal processes occurring in a direct junction by analyzing the physical processes occurring in a direct passage of electric current. On principle, a hole production takes place in one semiconductor (metal contact) and an electron production in the other. In the following, recombination processes take place in the region

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Injection Heat Transfer

81357 S/181/60/002/03/11/028 B006/B017

between the contacts. (On the passage of current in the opposite direction pair production and an emission of electrons or holes to the contacts takes place in the region between the contacts). The majority of the recombination effects occur in a region which depends on the ratio between the diffusion length L (of the holes in the n-region and/or the electrons in the p-region) and the diode dimension d (width of the p- and n-regions, respectively). In the present paper, the limiting cases d>L and d≪L are analyzed. A model of the diode concerned is shown in the Fig. It is shown that in the case of recombination in the volume-charge layer and in a recombination at the metal-semiconductor contacts the occurring thermal processes are of opposite character. Heat transfer by injected non-equilibrium carriers is regarded. The Peltier coefficient and the differential thermo-emf are determined for an unsymmetrical diode with the aid of the ordinary thermodynamic relations. If there exist nonequilibrium carriers, these two quantities depend on the amperage of the passing current since the current changes the carrier concentration near the p-n junction (both increase with increasing amperage). Finally, the author describes an investigation of the temperature difference occurring

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Injection Heat Transfer

S/181/60/002/03/11/028 B006/B017

in a diode on the passage of direct current. For a special case (p-type germanium at room temperature) the thermo-emf is estimated to be $\alpha_p \simeq 172~\mu v/deg$, and the maximum temperature difference $\Delta\,T_m = 6 - 0.4~Q_O$ (Q_O - transferred heat in watts). Finally, the possibility of applying injection heat transfer in the production of refrigerators is discussed. There are 1 figure and 4 references: 2 Soviet and 2 Czech.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR Leningrad (Institute

of Physics and Technology of the AS USSR, Leningrad)

SUBMITTED: June 15, 1959

 \mathscr{X}

Card 3/3

STAFEYEV, V. I., Doc Phys-Math Sci, "New Geration

PRINCIPLES OF SEMICONDUCTOR DEVICES." Moscow, 1961.

(ACAD SCI USSR, Phys Inst in P. N. Lebedev). (KL, 3-61, 202).

2.7

STAFEYEV, V.I.

Direct branch of volt-ampere characteristic of a nonsymmetric diode. Fiz. tver. tela 3 no.1:185-193 Ja 61. (MIRA 14:3)

l. Leningradskiy fiziko-tekhnicheskiy institut AN SSSR imeni akad. A. F. Ioffe. (Diodes)

20776

s/181/61/003/003/001/030 B102/B214

9.4300 (1043,1137,1143)

AUTHORS:

Karakushan, E. I. and Stafeyev, V. I.

TITLE:

Magnetic diodes

PERIODICAL:

Fizika tverdogo tela, v. 3, no. 3, 1961, 677-686

TEXT: The present paper gives a theoretical study and the results of experimental investigations of the effect of a magnetic field on the volt-ampere characteristics of semiconductor diodes. This effect has been studied once before (Ref. 1: Radio a. Telev. News, July, 10, 1952) and found to be very small (Ge diodes). Stafeyev has, however, shown that, under certain conditions, there exists a large dependence of the forward current on the magnetic field in the case of "long" diodes. Now, first the effect of the field on minority carriers, particularly on their mobility, is studied considering the effect of surface recombination (Suhl effect) to be negligible. The first effect of the magnetic field is that the carrier mobility decreases, as a result of which the resistivity of the semiconductor increases. If it is as-

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20776 S/181/61/003/003/001/030 B102/B214

Magnetic diodes

sumed that $\mu_p = \mu_n$, one has $\frac{1}{\sqrt{9}} \frac{dQ_0}{dH} = -\frac{1}{\mu_p} \frac{d\mu_p}{dH}$. Another effect of the magnetic field is to decrease the diffusion length of minority carriers: $\frac{1}{l_a}\frac{dl_a}{dH}$

 $\frac{1}{2\mu_p} \frac{d\mu_p}{dH}$; accordingly, the minority carrier distribution is determined by $p - p_0 = p_0(e^{-1}) \frac{d-x}{L} / sh\frac{d}{L}$, where $L = l_d$ and V_0 is the potential drop in the region of the volume charge of the p-n junction. The magnetic field thus affects not only the mobility of minority carriers (diode) but also their concentration. The first part of the paper is concerned with a study of the effect of the magnetic field on the reverse current and, in the case of low (a) and high (b) injection levels, on the forward current. In case (a) one has:

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Magnetic diodes $I = I_{\bullet} \left(\frac{e(I - iR_T)}{e^{-\frac{1}{L}T}} - 1 \right), \qquad (4)$ $R_T = \rho_d \left[1 + (b - 1) \frac{L}{d} \operatorname{th} \frac{d}{L} \right], \qquad I_{\bullet} = \frac{kT \mu_p p_0}{L} \operatorname{cth} \frac{d}{L}$

(I - current density, V - voltage applied to the diode, $^{Q}_{0}$ - resistivity of the semiconductor, d - its thickness in the diode, L - effective diffusion the semiconductor, d - its thickness in the diode, L - effective diffusion the semiconductor, d - its thickness in the diode, L - effective diffusion the ength; in case (a) L = $^{1}_{d}$; b = $^{\mu}_{n}/^{\mu}_{p}$ - mobility ratio, $^{\tau}_{p}$ - carrier lifelength; in case (a) L = $^{1}_{d}$; b = $^{\mu}_{n}/^{\mu}_{p}$ - mobility ratio, $^{\tau}_{p}$ - carrier lifelength; in case (a) L = $^{1}_{d}$; b = $^{\mu}_{n}/^{\mu}_{p}$ - equilibrium concentration of minority carriers (holes in the n-type semiconductor considered)). For d/L % 1 one has riers (holes in the n-type semiconductor considered)).

 $\frac{1}{l}\frac{dl}{dH} = -\frac{1}{2} \left\{ 1 + \frac{\frac{q(l-l_0)}{kT}R_T}{1 + \frac{q(l-l_0)}{kT}R_T} \right\} \frac{1}{p_0} \frac{dp_0}{dH}. \tag{7}$

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11)

20776 S/181/61/003/003/001/030 B102/B214

Magnetic diodes

In case (b) I = I_oe^{qV/CkT} and C = 2(b+ch^d/_L)/(b+1). For d/L < 1: $I = 2\frac{kT\mu_{p}n_{i}}{d}e^{qV/2kT} \quad \text{(for H = 2800 oe, } \Delta q_{o}/q_{o} = 0.4-0.7\%). \text{ For e}^{d/L} \gg 1 \text{ one has:}$ $\frac{1}{I}\frac{dI}{dH} = -\frac{d}{2L}\left(\ln\frac{I}{I_{e}} - 1 + \frac{L}{d}\right)\frac{d\rho_{o}}{\rho_{o}dH}. \quad \text{(15a)}$

or for large currents:

 $\frac{1}{l}\frac{dl}{dH} \simeq -\frac{d}{2L}\ln\frac{l}{l_0}\frac{1}{\rho_0}\frac{d\rho_0}{dH} = -\frac{d}{2L}\frac{qV}{CkT}\frac{1}{\rho_0}\frac{d\rho_0}{dH}.$ (16)

If d/L>4, one has

 C_{ij}

 $\frac{I_0}{I_g} \simeq e^{-\frac{\sigma}{L_0} \frac{L_0 - L_g}{L_H}} e^{(b+1)\frac{\sigma}{L_1} \left(-\frac{\sigma}{L_1} - \frac{1}{L_g} \right)}$ (18a)

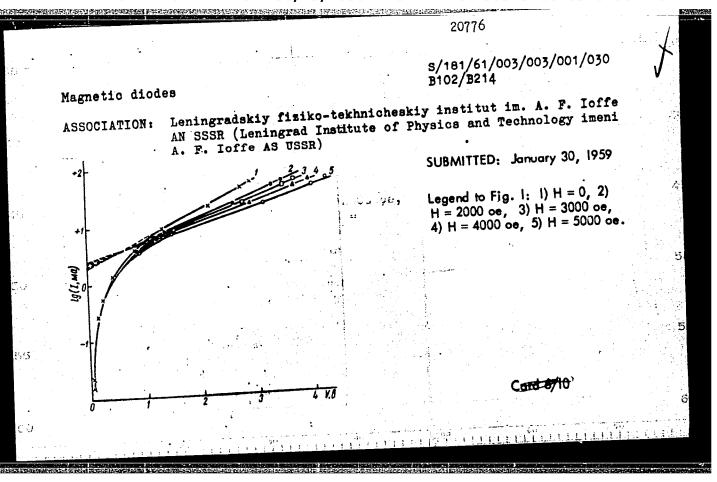
From the latter it follows, for example, for d/L = 6 and I = 10³I that a magnetic field which lowers L by 20% reduces the forward current 40-50 card 440

s/181/61/003/003/001/030 B102/B214

Magnetic diodes

times. The second part of the paper gives experimental results (study of the H dependence of the diode current for $q_0 = 50$ ohm cm, L = 0.5 mm, diameter of the p-n junction: 0.9 mm, d = 2,5 mm; p-n junction due to indium, ohmic contact: tin). The specimens were cylinders of different heights given in mm (for example, diode T-3.0: cylinder 3.0 mm high). Results are shown in Figs. 1 - 3 and in a table. Finally, the third part of the paper gives a report on a study of magnetic diodes. Preliminary investigations had shown that diodes of very high magnetic sensitivity can be prepared. The conditions required are high current density and large d/L. Diodes whose schematic representation is given in Fig. 5 were prepared with particular regard to good heat dissipation. Fig. 6 shows the direct branches of the volt-ampere characteristics of such a diode (D-3.0) for different magnetic fields. With a field, for example, of H = 119,300 oe, the forward current in the diode changes by a factor of 200. From the volt-ampere characteristic at H = 0 it is found that C_0 = 104 and d/L = 5.7. These diodes were made of the same material as the T-diodes. Ye. A. Gamilko is thanked for help in the preparation of the specimens. There are 7 figures, 1 table, and 7 references: 4 Soviet-bloc and 3 non-Soviet-bloc.

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25690 s/181/61/003/007/012/023 B102/B214

94.7700 (1137, 1144, 1385)

Karakushan, E. I., and Stafeyev, V. I.

TITLE:

AUTHORS:

Magnetic diodes with large area

PERIODICAL: Fizika tverdogo tela, v. 3, no. 7, 1961, 2031-2040

TEXT: A new semiconductor device, the magnetic diode, whose forward current depends strongly on the strength of the magnetic field, was described and studied in earlier papers of the authors (FTT, I, 841, 1959; FTT, III, 677, 1961; ZhTF, XXVIII, 1631, 1958). In the present paper, further peculiarities in regard to the structure and properties of such diodes are given. First of all, the magnetic sensitivity of these diodes is discussed, and it is shown that this sensitivity is substantially higher than what would be expected from the theory. The high magnetic sensitivity is above all, due to the fact that the magnetic field decreases the diffusion length L, which leads to a reduction in the number of nonequilibrium carriers and to a significant increase of the resistance of the semiconductor layer. There is a charge redistribution between this layer and the p-n junction; the decrease of the potential

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Magnetic diodes with large area

at the p-n junction causes a decrease of the injection and leads to a new charge redistribution. By this process, the initially insignificant change in mobility leads to a significant change in the forward current. Equations are derived for the current and voltage sensitivities, the symbols used being those of the earlier papers. In the following, the authors calculate the optimum thickness of the magnetic diode: $d/L=\frac{1}{2}ln\left[2(q/kT)^2(b+1)^2Q_0L/Yl^Y\right];$ Y=2d/L-1. Now, magnetic diodes with large area are investigated, i. e. those whose p-n junction has an area of ~0.6cm2 and whose lateral surface areas are negligible. Fig. 1 shows schematically such a diode with water cooling. The thickness of the semiconductor is chosen for convenience as d=5L=3mm, and the resistivity of the n-type semiconductor (starting material) between 40 and 50 chm cm. The p-n junction is formed by infusion of indium, and the ohmic contact by infusion of tin (in a hydrogen atmosphere). Table 1 gives the measured values of the characteristic parameters of several types of such diodes. In the following, the section-type of magnetic diodes is briefly discussed. Fig. 6 shows the view of such a diode; the characteristics of some types of this kind are given in Table 2. The most important results of the Card 2

25690 \$/181/61/003/007/012/023 B102/B214

Magnetic diodes with large area

investigations are the following: In magnetic diodes with sufficiently large cross sections one must take into account the curvature of the current lines due to which the effective distance between the p-n junction and the ohmic contact becomes larger. Under certain conditions, $\Delta d/d$ can exceed $\Delta L/L$ by 10 to 15 times. The magnetic sensitivity of both kinds of magnetic diodes exceed the theoretical value by a large amount if only the change of the diffusion length is taken into consideration. The change in the current $\Delta I/I_{\rm H}$ of the magnetic diodes in the magnetic field reaches a value 100 times as large as the corresponding change of the resistance $\Delta V_0/V_0$ of the single crystal. In the whole range of H investigated, $\Delta I/I_{\rm H}$ varies in proportion to H. The rise and fall of the voltage at the diode also follows the same law for direct current. In a field of 3000 gauss, the current strength is changed 2-4 times, while $\Delta V_0/V_0 \approx 2\%$. There are 6 figures, 2 tables and 3 Soviet-bloc-references.

ASSOCIATION:

Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR Leningrad (Institute of Physics and Technology imeni A. F. Ioffe, AS USSR, Leningrad)

Card 5/6

9,4177(1051,1114)

25069 \$/181/61/003/009/001/039 B102/B104

AUTHOR:

Stafeyev, V. I.

TITLE:

Photoconductivity in a semiconductor diode caused by a

change of lifetime

PERIODICAL: Fizika tverdogo tela, v. 3, no. 9, 1961, 2513-2518

TEXT: Two kinds of processes are started by an illumination of semiconductors: (1) An increase of carrier concentration. The operation of photoresistors, photodiodes, and photocells is based on this process which is here called "concentration mechanism". (2) A change of the carrier lifetime T, which influences the properties of the devices concerned. Among other things, this change gives rise to nonlinear effects. The author had shown in previous papers that a change of T due to illumination may be, in diodes, the principal effect determining photoconductivity. Photocurrent due to a change of T may exceed the "concentration" photocurrent by several orders of magnitude. The conductivity concerned here is called T-photoconductivity. It may occur in semiconductors with non-equilibrium dark conductivity. The T-mechanism may lead either to "self-

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s/181/61/003/009/001/039

Photoconductivity in a semiconductor ...

quenching" (sublinearity) or to "self-amplification" (hyperlinearity) of photoconductivity. T-photoconductivity in semiconductor diodes with p-n junctions was the subject of the present study. New and interesting effects associated with T-photoconductivity are observed when producing non-equilibrium conductivity by carrier injection or extraction by means of a p-n junction. Theoretical considerations indicate that the T-mechanism leads to an opposite change of forward and reverse current under illumination. Thus, if illumination effects an increase of forward current in the diode, the reverse current is bound to drop at the same time. If nonequilibrium conductivity is positive, a change of T will lead to a change of the recombination rate of excess carriers; if negative, it will lead to a change of the dark generation rate of the carriers. Since, in case of T-conductivity, there exist no restrictions to the effective quantum yield, it is possible on the basis of the T-mechanism to work out devices whose photoconductivity is some orders of magnitude higher than the one whose function is based on the "concentration" mechanism. Experiments were made on n-type germanium L-diodes (resistivity 60 ohm cm at room temperature) at $77^{\circ}\mathrm{K}$. The volt-ampere characteristics were taken for forward and reverse

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L 12641-63 BDS/EWG(k)/EWP(q)/EWT(m)/EEC(b)-2 AFFTC/ASD/ESD-3
ACCESSION NR: AT3002985 Pz-4 IJP(C)/JD/AT S/2927/62/000/000/0086/0093

AUTHOR: Afenas yeva, N. P.; Stafeyev, V. I.

TITLE: Effect of impurity concentration in the low-resistance region of p-n junction on the forward current [Report of the All-Union Conference on Semiconductor Devices held in Tashkent from 2 to 7 October 1961]

SOURCE: Elektronno-dy*rochny*ye perekhody* v poluprovodnikakh. Tashkent, Izd-vo AN UZSSR, 1962, 86-93

TOPIC TAGS: germanium diode, germanium diode forward current

ABSTRACT: In 1957-58 the authors investigated the linear section of the current-voltage characteristic of germanium diodes at heavy currents; particularly the effects of temperature and alloyed impurity were studied. The results are reported in the article. Two groups of diodes were tested: (1) p- and n-type germanium (with a resistivity of 10 ohm.cm) and alloys containing Bi, Sb, In, and Au; (2) n-type germanium (with a resistivity of 1 ohm.cm) plus In alloyed with Pb, Ga, and Al. Current-voltage characteristics of the above diodes obtained experimentally at room and at liquid-nitrogen temperatures are presented. Carrier

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L 12641-63

ACCESSION NR: AT3002985

concentrations are estimated for various test conditions. Two families of current-voltage curves, determined within -50 +100C, are given for In and InGa alloys. The following conclusions are offered: (1) at heavy currents, the current-voltage relation becomes linear; (2) the residual resistance, determined by the p-n-junction alloy, is an inverse function of the carrier concentration in the low-resistance region; (3) to explain the observed value of the residual resistance, it should be assumed that the concentration at p-n junction is within 2 -4 x 10 sup 17 cm sup -3 (for the 2nd group); (4) the residual resistance grows with temperature approximately according to the same law as the carrier mobility; (5) at a certain "inversion" voltage, the forward current-temperature relation changes sign. Orig. art. has: 6 figures, 1 formula, and 2 tables.

ASSOCIATION: Akademiya nauk SSSR (Academy of Sciences SSSR) Akademiya nauk Uzbekskoy SSR (Academy of Sciences UzSSR) Tashkentskiy gosudarstvenny*y universitet (Tashkent State University)

SUBMITTED: 00

DATE ACQ: 15May63

ENCL: 00

SUB CODE: 00

NO REF SOV: 004

OTHER: 007

Card 2/2

STAFEYEV, V.I.; VAN SHOU-TSZYUYE [Wang Shou-chueh]; FILINA, L.V.

Transistors with N-shaped characteristics. Radiotekh. i elektron. 7 no.8:1404-1408 Ag '62. (MIRA 15:8)

1. Fiziko-tekhnicheskiy institut im. A.F.Ioffe AN SSSR. (Transistors)

s/109/62/007/008/011/015 D409/D301

9.4310

Stafeyev, V.I., Wang Shou-chueh, and Filina, L.V.

JUTHORS:

Triodes with N-shape characteristic

TITLE:

Radiotekhnika i elektronika, v. 7, no. 8, 1962,

PERIODICAL:

1404-1408

The properties of triodes are considered, in which the negative resistance is related to a widening of the space-charge region. A qualitative theory for such triodes is proposed. Two types of triodes are described; (these were developed in the winter of 1957/58, while Wang Shou-chueh, member of the Institute of Applied Physics of the AS Chinese People's Republic, worked in the laboratory (see Association)). Whereas similar triodes, developed at that time by other investigators, were of little practical interest, the triodes developed by the authors have much better character, the triodes developed by the authors devices. The current waltteristics, and can be used in switching devices. The current-voltage characteristic of a triode with base-resistance modulation, is analyzed. The theoretical current-voltage curves of such triodes.

Card (1/3)

Triodes with N-shape characteristic

S/109/62/007/008/011/015 D409/D301

are plotted for different values of $d_{\rm o}/W_{\rm o}$ ($d_{\rm o}$ being the distance from the collector p-n junction to the opposite surface, and W_0 the width of the space-charge region for zero voltage at same junction). From the figure it is evident that the larger do/Wo, the broader the negative-resistance region and the closer the characteristic to that of an ordinary transistor triode. The above theoretical considerations were used in the preparation of N-triodes. First, a low-frequency triode was prepared from n-type germanium with a resistivity of about 40 ohm.cm. The cut-off frequency of such triodes does not exceed several tens of kilocyles, and their peak operating point is also inconvenient. Therefore another type of N-triode was prepared by the method of diffusion melting. A very thin n-type base layer was formed by the diffusion of antimony in a p-type germanium layer. The base contact was formed by the alloy Pb-Sb, and the emitter by the alloy In-Ga-Sb. The addition of Ga improves the injection properties of the emitter. The current-voltage characteristics of such a triode are shown. The base layer is very thin, but highly conductive. Therefore its resistance changes sharply with the collector voltage. The negative-resistance region corresponds to a Card 2/3

Triodes with N-shape characteristic

\$/109/62/007/008/011/015 D409/D301

0.1 volt range of variation of the collector voltage; the magnitude of the negative resistance is of the order of several ohm. In the cut-off state, the current equals the reverse current of the collector pan junction, and is practically independent of voltage shifts at the emitter. Hormally, the collector current is of the order of 0.1 milliamp., up to voltages of several tens of volts. The cut-off frequency of the negative resistance is normally several magacycles; but it could reach several tens of megacycles. There are 6 figures.

ASSOCIATION:

Fiziko-tekhnicheskiy institut im. A.F. Toffe AN 3SSR

(Physico-technical Institute im. A.F. Ioffe of the

AS USSR)

SUBMITTED:

December 16, 1961

Card 3/3

S/181/63/005/004/002/047 B102/B186

AUTHORS:

Vorob'yev, L. Ye., Karakushan, E. I., and Stafeyev, V. I.

TITLE:

Effect of a magnetic field on the carrier distribution in the

body of a magnetodiode

PERIODICAL:

Fizika tverdogo tela, v. 5, no. 4, 1963, 982 - 989

TEXT: The experiments described were made on large-area magnetodiodes with uniform (Figs. 4, 5) or with subdivided (Fig. 10) p-n junctions (Ge). The diode was placed between the pole pieces of a magnet which were protided with social openings (ef. Fig. 1). An incandescent lamp was used as light source (1.8 - 2.5\mu) its light pulses (4 mag) being synchronized with the current pulses sent through the diods. In this wavelength range with the absorption coefficient was proportional to the free carrier concentration, the reflection coefficient was 35\mu. The high magneto-sensitivity of tion, the reflection coefficient was 35\mu. The high magneto-sensitivity of these diodes is due to the fact that the magnetic field alters the spatial distribution of the non-equilibrium carriers in the body of the semicondistribution of the non-equilibrium carriers in the body of the semicondistribution. The changes arise both along and transverse to the current lines and were determined from the light absorption. The results are shown in form of graphs. There are 10 figures and 1 table.

S/181/63/005/004/002/047 B102/B186

Effect of a magnetic field on ...

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad)

SUBMITTED: September 24, 1962

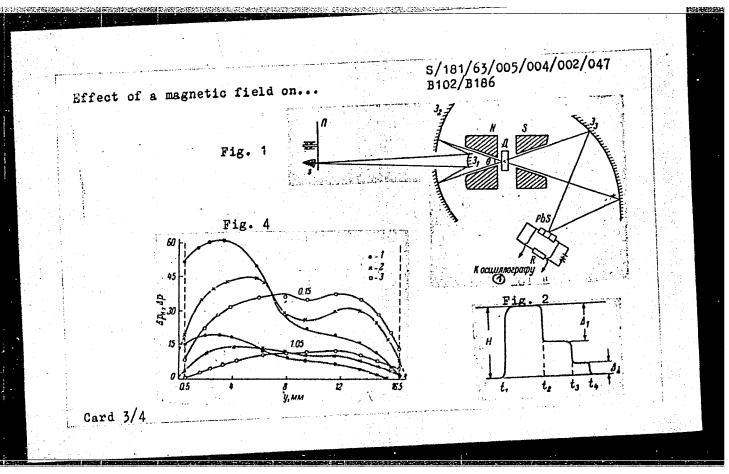
Fig. 1. Optical arrangement. Legend: A-Magnetodiod, NS - magnet, 3_{1,2,3} mirrors, PbS - photoresistor as receiver, N-modulator, S - spiral; (1) to the oscilloscope.

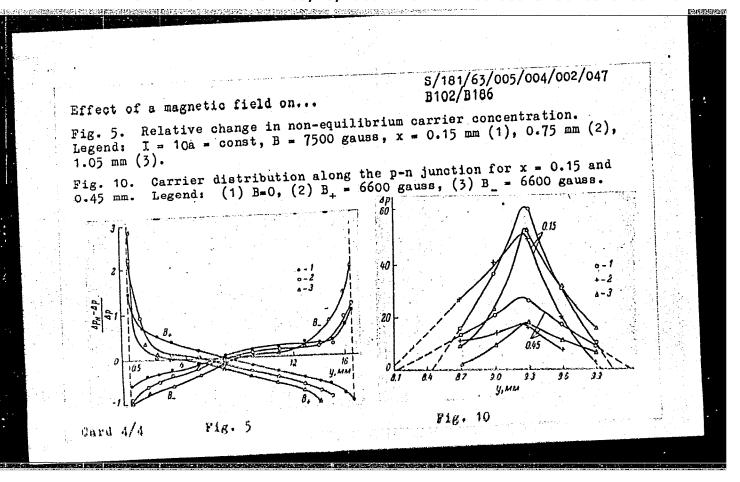
Fig. 2. Shape of pulse received by the PbS. Legend: t₁ start of light pulse, t₂ etart of current pulse, t₃ end of light pulse, t₄ end of current pulse.

Fig. 4. Non-equilibrium carrier distribution along the p-n junction with and without magnetic field for x=1.05 and x=0.15 mm. Legend: $I \simeq 10$ a, B = 7500 gauss; (1) B₊, (3) B₋, (2) B=0.

Card 2/4

"APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652810011-6





APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001652810011-6"

STAFEYEV, V.I.

Some properties of germanium with admixture of gold. Fiz. tver. tela 5 no.11:3095-3104 N '63. (MIRA 16:12)

1. Fiziko-tekhnicheskiy institut imeni A.F. Ioffe AN SSSR, Leningrad.

11270-63 ACCESSION NR: AP3003721 s/0109/63/008/007/1199/1209

AUTHOR: Shtager, A. P.; Stafeyev, V. I.

TITLE: Volt-ampere characteristics of a double-base diode

SOURCE: Radiotekhnika i elektronika, v. 8, no. 7, 1963, 1199-1209

TOPIC TAGS: double-base diode, volt-ampere characteristics, emitter inverse current, cutoff voltage, residual voltage, negative resistance, differential resistance

ABSTRACT: On the basis of the previous investigations of one of the authors, analytical expressions for negative resistance and cutoff and residual voltages are derived for double-base diodes. In order to verify the theoretical data obtained, a series of n-type germanium double-base diodes with a resistivity of 40 dm x cm and an inverse current of the emitter junction on the order of 10 μamp has been developed. Cutoff voltage depended to a large degree on the thickness of the initial germanium plate and usually, at voltages between bases of 8 to 10 v, was on the order of 5-7 v. The negative resistance region became apparent in the region of negative emitter currents; the value of the negative resistance was on

L 1 1 270-63 ACCESSION MR: AP3003721

the order of 20-30 chm. The cut in current was on the order of 10 µsmp, and the cutoff current was approximately 1 mamp. The differential resistance of the actuated diode was 20-60 chm, . while that of the cutoff diode was on the order of 1 Mohm. It was concluded that: 1) resistance between the emitter and collector is modulated by the emitter current and does not depend on the electric field; 2) the switching on of the diode occurs during the inverse current flow, which is about equal to the saturation current; 3) cutoff voltage is determined by the resistance between the emitter and the collector and by the current in the base circuit; 4) residual voltage is determined by the effective lifetime of the carriers in the device (since double-base diodes are manufactured from thin semiconductor plates, the carrier lifetime is determined mainly by the rate of surface recombination); 5) negative resistance of experimental models was on the order of several tens of kohm; and 6) differential resistance with the diode switched on was on the order of 40-60 ohm, which was higher than the values predicted on the basis of theory by factors of 1.5-2.0. Orig. art. has: 10 figures and 13 formulas.

ASSOCIATION: none

Card 2/3/2

7 (2/56)

[Magnetodiodes: semiconfluctor devices with high magnetic sensitivity] Magnitodiody; poluprovednikovye pricery sensitivity] (MIRA 17.9) (MIRA 17.9)

SONDAYEVSKIY, V.P.; STAFEYEV, V.I.

Injections into semiconductors with deep impurity levels. Fiz. tver. tela 6 no.1:80-91 Ja '64. (MIRA 17:2)

1. Fiziko-tekhnicheskiy institut imeni A.F.Ioffe AN SSSR, Leningrad.

ACCESSION NR: AP4040914

S/0109/64/009/006/1040/1046

AUTHOR: Shtager, A. P.; Stafeyev, V. I.

TITLE: N-shaped characteristic of the double-base diode

SOURCE: Radiotekhnika i elektronika, v. 9, no. 6, 1964, 1040-1046

TOPIC TAGS: semiconductor, semiconductor diode, double base diode, N shaped characteristic

ABSTRACT: Assuming that: (a) the model is single-dimensional, (b) the semiconductor has a near-intrinsic conductivity, (c) the emitter is of the point-contact type, and (d) the injection coefficient is 1, these formulas are developed to describe the current-voltage characteristic:

base-to-base voltage $V_{bb} = \left[V_{e} - \frac{kT}{q} \ln \left(\frac{I_{e}}{I_{s}} + 1\right)\right] \left(\frac{R_{rs}}{R_{ri}} + 1\right) - I_{e}R_{rs}$

base-to-base current $I_{bb} = \left[V_e - \frac{kT}{q} \ln \left(\frac{I_e}{I_e} + 1 \right) - I_e R_{\tau_i} \right] / R_{\tau_i}$

where Ve and Ie are the emitter voltage and current, Is is the saturation current

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ACCESSION NR: AP4040914

 R_{r1} is the resistance between the emitter and the principal base, and R_{r1} is the resistance between the emitter and the second base. Double-base symmetrical and nonsymmetrical diodes described in the authors' earlier work (Rad. i elektronika, 1963, 8, 7, 1199) were tested; their p-n junction saturation current was about 20 microamp and $t_1/L \approx 3$. Due to the finite size of the emitter in the real diodes, the theoretical and experimental I/V N-shaped characteristics stand only qualitative comparison. The best base-to-base characteristics were observed in the nonsymmetrical diode connected with a short principal base. Optimum switching characteristics were obtained with minimum 1, and L securing the required resistance of the closed diode; 1, is the principal base length, L is the diffusion length. Orig. art. has: 8 figures and 8 formulas.

ASSOCIATION: none

SUBMITTED: 22Apr63

ATD PRESS: 3091

ENCL: 00

SUB CODE:

NO REF SOV: 001,

OTHER: 002

| Card 2/2